PROC. ENTOMOL. SOC. WASH.
79(3), pp. 367–376

NOTES ON THE SPECIES OF *NEORHIZOECUS* HAMBLETON, A SYNONYM OF *RHIZOECUS* KÜNCKEL D'HERCULAIS (HOMOPTERA: PSEUDOCOCCIDAE)

Edson J. Hambleton

Abstract.—Notes and illustrations are given on the five species of *Rhizoecus* previously included in *Neorhizoecus* together with diagnostic species characters, hosts, and distribution records.

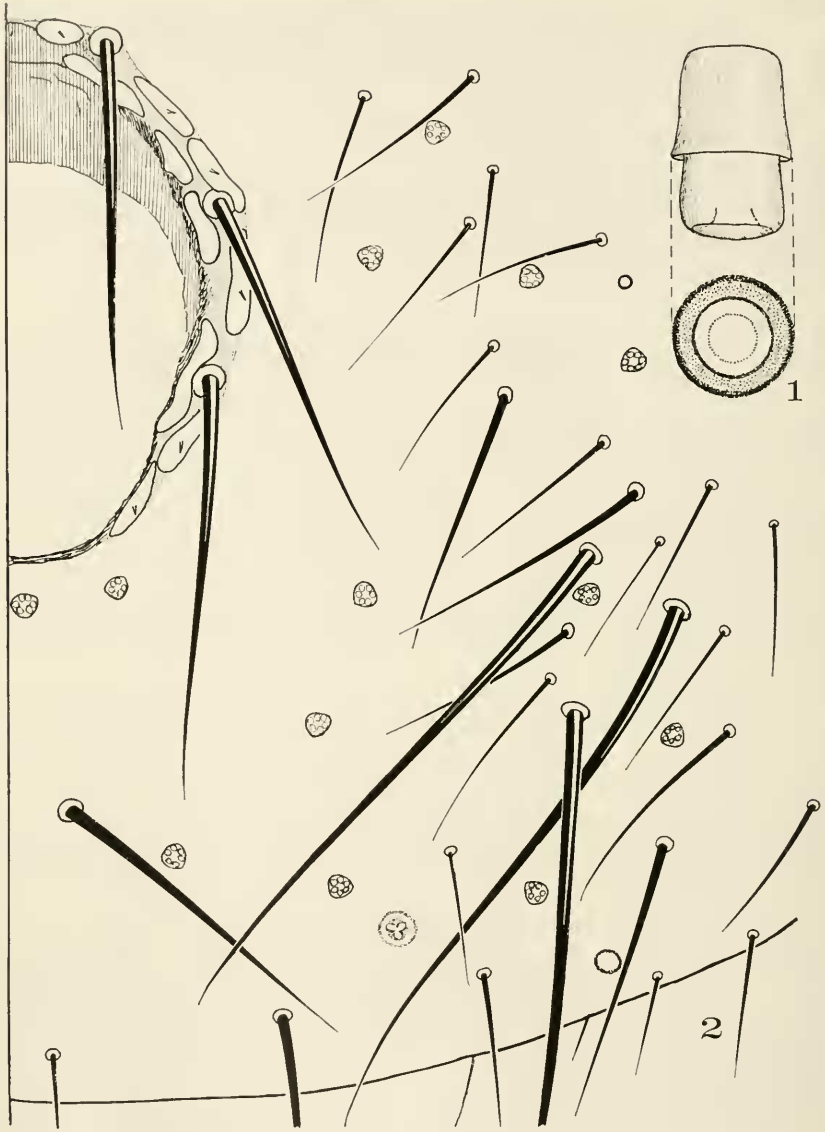
In 1946, I published a description of the genus *Neorhizoecus* to accommodate four neotropical species that closely resembled *Rhizoecus* Künckel d'Herculais. The diagnostic features of *Neorhizoecus* are its oval body shape, 5-segmented antennae, short setose digitules, absence of eyes and tubular cerores. Williams (1970) described a fifth species *N. epicopus* from Barbados and Trinidad with tritubular cerores, and noted that these structures were also present on *N. coffeae* (Laing), the type-species. After verifying these observations, I located a single ceroris in each of two paratypes of *N. setosus* Hambleton. Examination of 56 additional specimens of *N. setosus* from Colombia and Peru indicated as many as 10 cerores on a single specimen, the Colombian specimens each averaged 4–5 cerores, and those from Peru 7–8.

The presence of cerores in three of the five species of *Neorhizoecus* and the intraspecific variation in these structures clearly eliminates the "absence of cerores" as a usable diagnostic character for the genus. The remaining features which characterize *Neorhizoecus* also lose their significance because they are equally applicable to *Rhizoecus*. For example, of the 52 recognizable American species of *Rhizoecus*, five have 5-segmented antennae, 26 have short, setose digitules, and six have no eyes. Consequently *Neorhizoecus coffeae* should be returned to *Rhizoecus*; *Neorhizoecus setosus* and *N. epicopus*, by virtue of their having cerores, should be placed in *Rhizoecus*. Although *Neorhizoecus andensis* Hambleton and *N. colombiensis* Hambleton have no cerores, it would seem logical for the time being to place them in *Rhizoecus* because their other characters agree generically.

The inclusion of the five *Neorhizoecus* taxa in *Rhizoecus* should broaden its composition and facilitate placement of some intermediate forms with characteristics of both *Neorhizoecus* and *Rhizoecus*. I therefore propose that the name *Neorhizoecus* be synonymized with *Rhizoecus*, and new name combinations be given accordingly.

Genus *Rhizoecus* Künckel d'Herculais

Rhizoecus Künckel d'Herculais, 1878:163. Type-species: *Rhizoecus falcifer* Künckel d'Herculais.



Figs. 1–2. *Rhizoecus coffeae*, female. 1. tubular duct, lateral and ventral. 2, anal ring, right half, and right anal-lobe area.

Neorhizoecus Hambleton, 1946:40. Type-species: *Neorhizoecus coffeae* Hambleton. New Synonym.

Rhizoecus andensis (Hambleton), new combination
(Figs. 15–18)

Neorhizoecus andensis Hambleton, 1946:41.

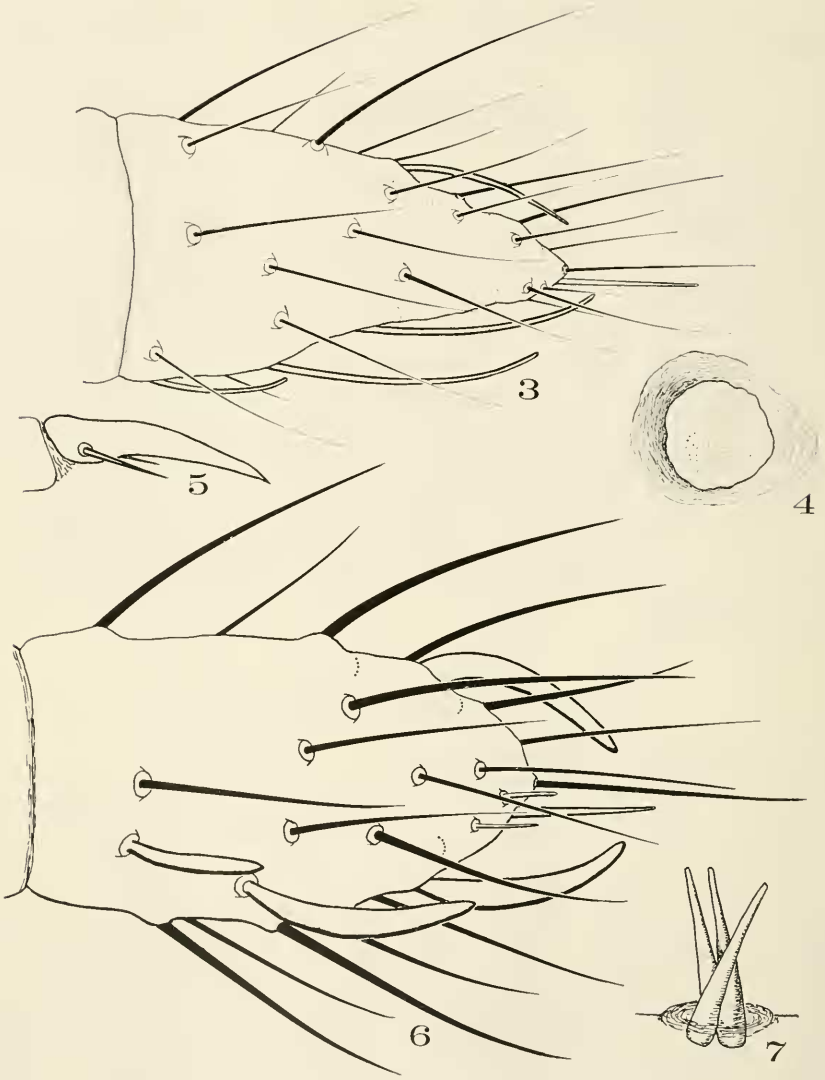
This species and *Rhizoecus colombiensis* (Hambleton) are the only known members of the genus without tubular cerores. *Rhizoecus andensis* is readily separated from *R. colombiensis* by having multilocular disk pores, no circulus, and distinctly shaped antennae and sensory setae. *Rhizoecus andensis* is known only from Colombia where it occurs on *Coffea arabica.*

Specimens Examined: Six ♀♀ mounted on 2 slides represent the syntype series of *Neorhizoecus andensis* from Bogota, Colombia, 22-II-1935, L. Murillo. I have selected the specimen nearest the label on slide #1 as the *lectotype.* The same slide contains 2 paralectotypes. Types in USNM. La Esperanza, 15-XI-1935, René Paul Robá (10♀♀, B.M.); locality (?), VIII, 1955, D. Rios Castana (4♀♀, USNM); locality (?), IV-1956, S. G. Flanders, (4♀♀, USNM); Chinchina, Cald., 18-XII-1975, R. Cardenas (24♀♀, USNM).

Rhizoecus coffeae Laing
(Figs. 1–2, 5–7)

Rhizoecus coffeae Laing, 1925:384.
Rhizoecus lendea Pickel, 1927:591.
Neorhizoecus coffeae: Hambleton, 1946:42; Ferris, 1953:386; Williams, 1970:155.

The selection of *Rhizoceus coffeae* Laing as the type-species of *Neorhizoecus* was erroneous because it possesses tritubular cerores and elongate anal-lobe setae. The species is here returned to its original combination. *Rhizoecus coffeae* resembles *R. setosus* (Hambleton) but may be distinguished from it by the more elongate anal-lobe setae and by the size of its tritubular cerores. The cerores in *R. coffeae* are small, 4–5 μ in diameter at their base, with slender, tapering ducts. Under low magnification they resemble circular pustules with broad borders. Dorsally there are 6–8 cerores on the head, 18–20 on thorax, and 48–50 on abdomen; occasionally a few occur ventrally. The cerores in *R. setosus* are much larger and occur in small numbers, from 0–11 are usually present. In both *R. setosus* and *R. coffeae* there are 2 short, slender, weakly curved sensory setae near the distal extremity of antennal segment V. These setae have also been observed in *R. andensis* but are not known to be present in other *Rhizoecus.*



Figs. 3–4. *Rhizoecus colombiensis*, female. 3, terminal segment of antenna. 4, circulus. Figs. 5–7. *Rhizoecus coffeae*, female. 5, hind claw. 6, terminal segment of antenna. 7, tritubular ceroris, lateral.

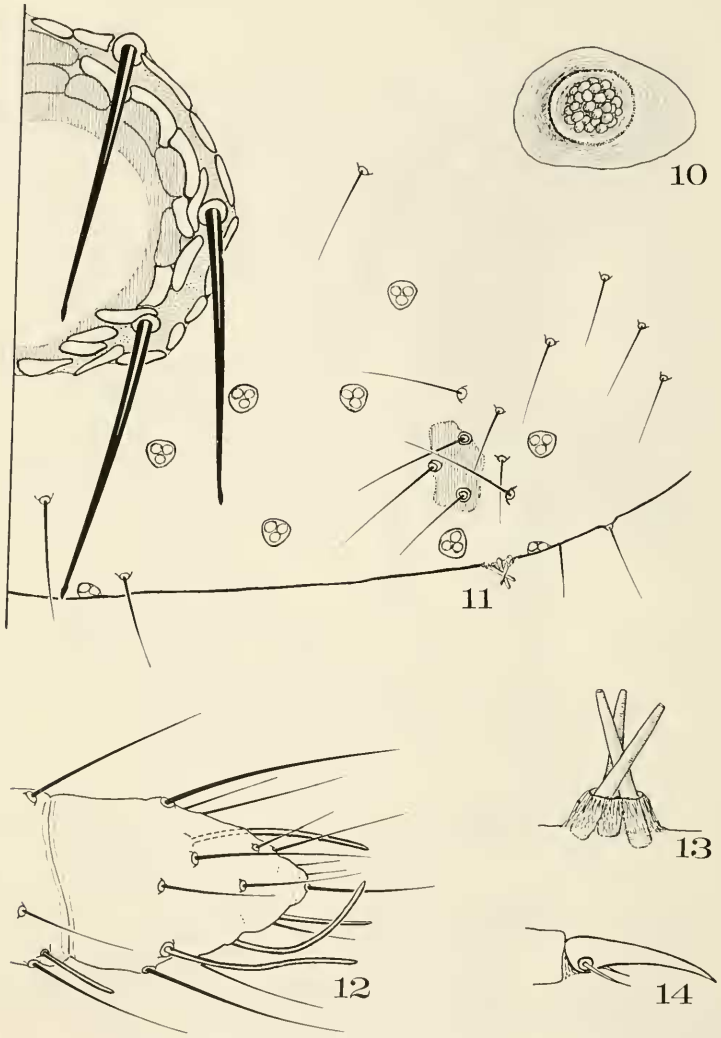
The known distribution of this coffee pest is Brazil, Costa Rica, Surinam and Venezuela.

Specimens Examined: *Holotype*, Paramaribo, Surinam, 13-V-1924, A. Reyne (Br. Mus.); same locality, 10-VII-1932, D. G. Bunzli (6♀♀, 4♂♂,

Figs. 8–9. *Rhizoecus colombiensis*, female. 8, hind claw. 9, anal ring, right half, and right anal-lobe area.

Br. Mus.); Bananeiras, Parahíba, Brazil, IX-1927, D. B. Pickel (6♀♀, USNM); Caruarú, Pernambuco, Brazil, 14-XII-1927, D. B. Pickel, 1-XI-1928, (3♀♀, USNM); Alajuela, Costa Rica, 14-VIII-1950, R. A. Davis (5♀♀, Br. Mus.); Alajuela, Costa Rica, 28-V-1932, 22-X-1951, R. Escheveria, et al. (50♀♀, USNM); Caraboba and Monagas, Venezuela, 12-V, 13-VII-1935, Shell Oil Co. (26♀♀, USNM).

Additional hosts of *R. coffeae* include *Axonopus compressus*, *Caladium bicolor*, *Coffea liberica*, *Cyperus chalaranthus*, *C. elegans* and *C. luzulae*.

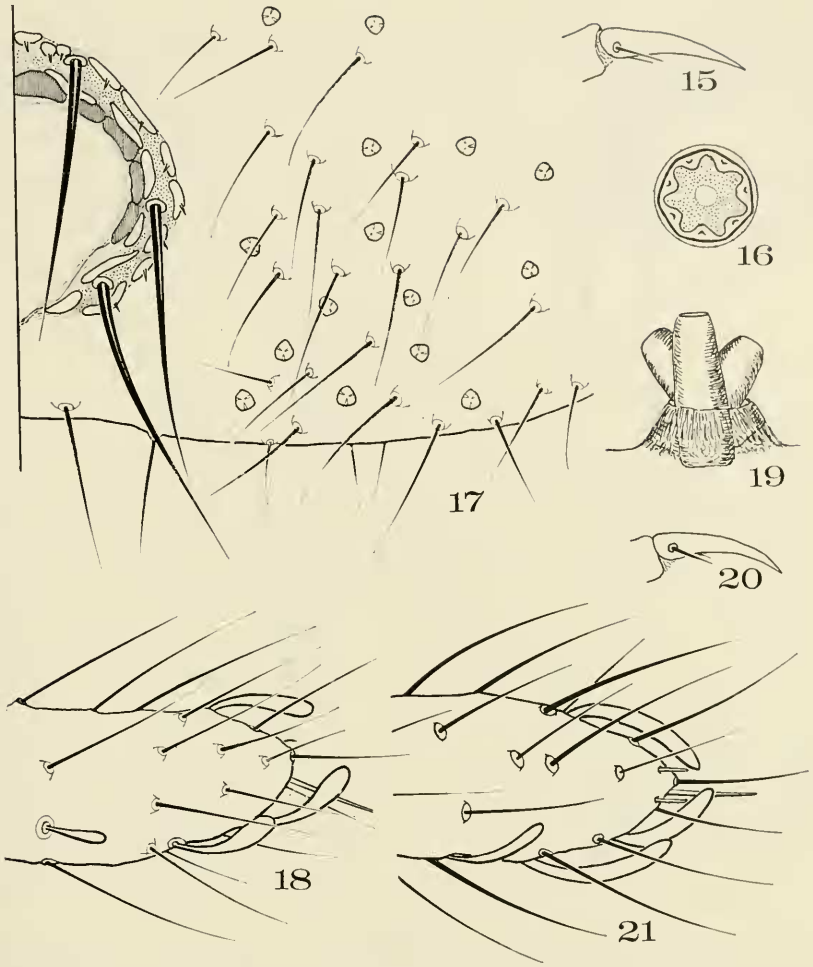


Figs. 10–14. *Rhizoecus epicopus*, female. 10, circulus. 11, anal ring, right half, and right anal-lobe area. 12, terminal segments of antenna. 13, tritubular ceroris, lateral. 14, hind claw.

Rhizoecus colombiensis (Hambleton), new combination
(Figs. 3–4, 8–9)

Neorhizoecus colombiensis Hambleton, 1946:43.

The important diagnostic characters of *R. colombiensis* are its very slender sensory setae, the well-structured anal ring, the disposition of the



Figs. 15–18. *Rhizoecus andensis*, female. 15, hind claw. 16, multilocular disk pore. 17, anal ring, right half, and right anal-lobe area. 18, terminal segment of antenna. Figs. 19–21. *Rhizoecus setosus*, female. 19, tritubular ceroris, lateral. 20, hind claw. 21, terminal segment of antenna.

short body setae in bands around the segments and the absence of tubular cerores and differentiated anal-lobe setae. Presumably, 1 circulus in the adult female is normal, however, 1 of 2 preadult females mounted with the holotype has a smaller circulus on the venter of abdominal segment III. This species is known only from the type-locality; its host is unknown.

Specimens Examined: *Holotype*, La Esperanza, Colombia, II-1936, René Paul Robá, and 2 paratypes, on same slide (USNM).

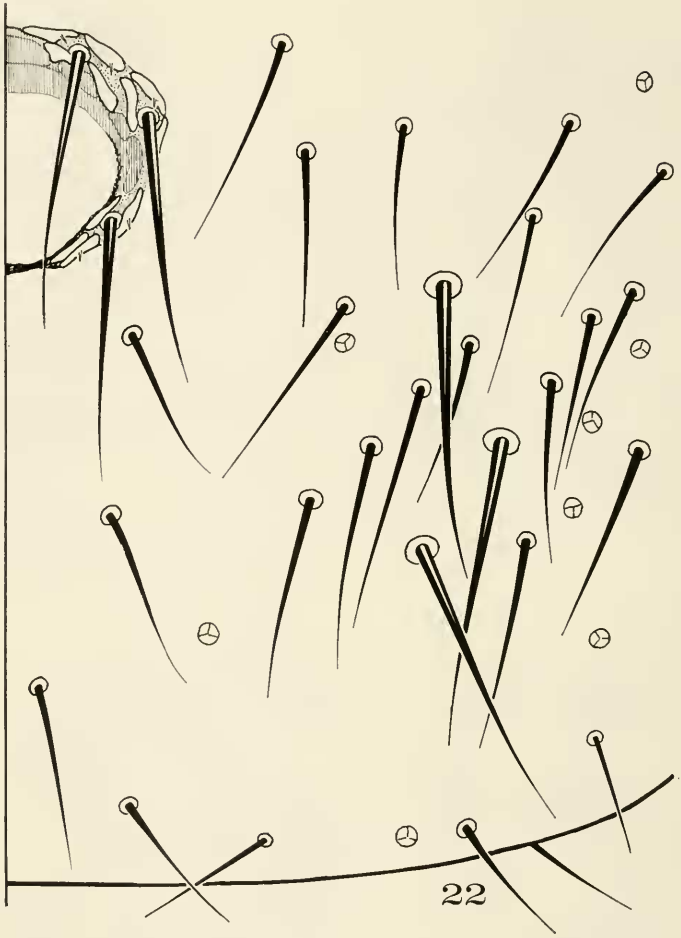


Fig. 22. *Rhizoecus setosus*, female; anal ring, right half, and right anal-lobe area.

Rhizoecus epicopus (Williams), new combination
(Figs. 10–14)

Neorhizoecus epicopus Williams, 1970:155.

The characteristic features of *R. epicopus* are its anal-ring setae with flattened or swollen apices, 4- to 6-segmented antennae, the narrow, elongate sensory setae, and the anal lobes each with 3–4 setae in a small sclerotized area. The anal-lobe setae are slightly longer than the short, slender body setae. This species should not be confused with *R. colombiensis* which it only slightly resembles. The anal ring of *R. epicopus* averages

59 μ wide compared to 77 μ for that of *R. colombiensis*. There are no cerores or differentiated anal-lobe setae in *R. colombiensis*, and the antennae are differently shaped.

Rhizoecus epicopus is known only from Barbados and Trinidad where it is a pest of sugarcane.

Specimens Examined: *Holotype* and 1 paratype, Barbados, on *Saccharum officinarum*, 1952, R. W. E. Tucker (Br. Mus.); 4 paratypes, same location and data (USNM); 3 paratypes, Woodford Lodge Estate, Trinidad, 30-VI-1948, R. G. Fennah (USNM).

Rhizoecus setosus (Hambleton), new combination (Figs. 19–22)

Neorhizoecus setosus Hambleton, 1946:46.

In general appearance *R. setosus* resembles *R. coffeae*, but the tubular cerores in *R. setosus* are larger and occur in fewer numbers, or may be absent, with no more than 11 in a single specimen; in *R. coffeae* there may be as many as 78. The multilocular disk pores in *R. setosus* occur only on the abdomen, whereas in *R. coffeae*, they are also scattered near the spiracles. See discussion under *R. coffeae*. In *R. setosus* the 3 anal-lobe setae are stouter and slightly longer than most body setae. *Rhizoecus setosus* is known from Colombia, Ecuador and Peru.

Specimens Examined: *Holotype* and 4 paratypes, Pichilingue, Ecuador, on undetermined Piperaceae, 30-IX-1944, E. J. Hambleton (USNM); Tingo Maria, Peru, 3-VI-1948, E. J. Hambleton (19♀♀, USNM); Supata, Cundinamarca Prov., Colombia, 22-X-1975, F. Mosquera (37♀♀, USNM).

Additional hosts include *Coffea arabica*, *Heliconia* sp. and an undetermined Gramineae.

Acknowledgments

I thank Dr. Douglas J. Williams, British Museum (Natural History), London, for the loan of type-material, and Dr. Douglass R. Miller, Systematic Entomology Laboratory, IIBIII, Agric. Res. Serv., USDA, Washington, D.C. for reviewing the manuscript.

Literature Cited

Ferris, G. F. 1953. Atlas of the scale insects of North America, VI, The Pseudococcidae (Pt. II):279–506. Stanford Univ. Press, Stanford, Calif.

Hambleton, E. J. 1946. Studies of hypogeic mealybugs. Rev. de Entomol. (Rio de Janeiro) 17(1–2):1–77.

Künckel d'Herculais, J. 1878. Histoire de la cochenille vivant sur les racines des palmiers de la section des Seaforthia. Ann. Soc. Entomol. Fr. 8(5):161–164.

Laing, F. 1925. Descriptions of two species of Coccidae feeding on roots of coffee. Bull. Entomol. Res. 15(4):383–384.

Pickel, D. B. 1927. Os parasitos do cafeeiro no Estado da Parahyba. Um novo parasito do cafeeiro, o piolho branco *Rhizoecus lendea*, n. sp. Chacaras e Quintais, S. Paulo, Brazil. 36(6):586–593.

Williams, D. J. 1970. The mealybugs (Homoptera, Coccoidea, Pseudococcidae) of sugar-cane, rice and sorghum. Bull. Entomol. Res. 60:109–188.

5140 Worthington Drive, Washington, D.C. 20016 and Systematic Entomology Laboratory, IIBIII, Agric. Res. Serv., U.S.D.A., Beltsville, Maryland 20705.